

**NATIONAL SCIENCE FOUNDATION  
ARLINGTON, VA 22230**

**Engineering Directorate  
Office of Industrial Innovation**

Report of the  
Advisory Committee for  
Small Business Innovation Research (SBIR) and  
Small Business Technology Transfer (STTR)  
Programs

21-23 June 2005

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**A. INTRODUCTION**

The National Science Foundation (NSF) Advisory Committee (AdCom) for the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs met June 21-23 2005 at NSF Headquarters facility in Arlington, VA. The meeting was held in Conference Room 1235.

Advisory Committee members in attendance were:

Dr. Sudhir Bhagwan	Ms. Penny K. Pickett
Dr. Chris Busch	Dr. David B. Spencer
Ms. Trish Costello	Dr. E. Jennings Taylor (Chairman)
Mr. Albert Johnson	Dr. Carole A. Teolis
Dr. Karen Kerr	Dr. Lizette Velazquez
Mr. Tom Knight	Prof. Meg Wilson
Mr. Richard Paul	

Advisory Committee members absent: Mr. Michael Sheridan

NSF representatives attending all or part of the meeting included:

Ms. Cheryl Albus, SBIR Program Manager  
Dr. Errol Arkilic, SBIR Program Manager  
Dr. John Brighton, Assistant Director, Engineering Directorate  
Dr. Juan E. Figueroa, SBIR Program Manager  
Dr. Joe Hennessey, Senior Advisor, SBIR Program  
Dr. Murali Nair, SBIR Program Manager  
Dr. Kesh Narayanan, Director, Industrial Innovation  
Dr. Sara B. Nerlove, SBIR Program Manager  
Dr. Mike Reischman, Deputy Assistant Director, Engineering Directorate  
Dr. T. James Rudd, SBIR Program Manager  
Dr. Om Sahai, SBIR Program Manager  
Dr. Rosemarie D. Wesson, SBIR Program Manager  
Dr. George Vermont, Metrics Research

NSF Technology Assistants:

NSF Triumph Technologies SBIR/STTR Project Team

Ms. Carla Lucas  
Mr. Joe Schweitzer  
Ms. Michelle Wood  
Mr. William Young

Other Participants and Attendees:

Mr. Neil MacDonald, Editor of Federal Technology Week  
Dr. Sujai Shivakumar, National Academies

## **B. ACTIVITIES SUMMARY**

### **Tuesday, 21 June 2005**

#### **Introduction**

Kesh Narayanan opened the meeting and introduced John Brighton (NSF Assistant Director, Engineering Directorate).

John Brighton addressed the AdCom, and described the NSF organization and the Engineering Directorate's role in it. He discussed briefly the plan to re-organize the Engineering Directorate and the elevation of the Office of Industrial Innovation to a Division of Industrial Innovation and Partnerships reporting directly to the ENG Assistant Director (AD).

Kesh Narayanan recognized the service of several members rotating off the AdCom. These members are: Dr. Nariman Farvardin and Ms. Jo Anne Goodnight. In addition, Kesh Narayanan recognized Chris Busch for his service as Past-Chairman of the AdCom.

Joe Hennessey distributed and explained the Conflict of Interest documentation. Said documentation was distributed to the AdCom members for review and signature.

Kesh Narayanan asked NSF representatives and AdCom members present to introduce themselves and to give brief background statements.

Jennings Taylor asked for discussion and/or motion to approve the report from the previous meeting. Chris Busch made a motion and Sudhir Bhagwan seconded the motion to approve the previous meeting minutes. The previous meeting report was unanimously approved by voice vote.

#### **Office of Industrial Innovation (OII) Strategy**

Kesh Narayanan presented the Office of Industrial Innovation (OII) Draft Strategic Plan. A full copy of the OII Draft Strategic Plan was provided to the AdCom members prior to the meeting. The broad goals of the OII Draft Strategic Plan were:

- I. Innovation Leadership
- II. Commercialization Partnership
- III. Competitive Workforce
- IV. Operational Excellence

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Kesh Narayanan presented the specific plans associated with these goals. In the OII Draft Strategic Plan, tasks are associated with the specific plans and ownership is assigned to OII staff.

The AdCom was very pleased with the thoughtful content of the OII Draft Strategic Plan. During and after the presentation, the AdCom provided comment and suggestions regarding the OII Draft Strategic Plan.

### **National Research Council (NRC) Update**

Sujai Shivakumar of the National Academies presented an update on the report “Capitalizing on Science, Technology, and Innovation: An Assessment of the Small Business Innovation Research Program.” A report describing the approach and methodology associated with the NRC study was published in April of 2004. The methodology includes both metrics and case studies approaches and will take into account tangible economic benefits and intangible “spillover” effects.

### **NSF Phase II/IIB Outcomes**

George Vermont presented the status of activities to measure the outcomes of Phase II/IIB projects. The goals associated with the activity are:

- 1) Define the appropriate assessments,
- 2) Determine the extent that the assessments can be converted into direct and indirect economic value metrics, and
- 3) Enforce regular reporting for five years subsequent to the completion of the Phase II/IIB project.

Dr. Vermont requested feedback on the questionnaire he was using to collect company updates. The AdCom had a number of questions about the metrics of success and appropriate ROI goals for a company 1, 3 and 5 years out from the end of Phase II. The ROI would be different for licensed technology, equity launched technology, etc. The OII staff expressed their intent in using these metrics for the Phase III commercialization reporting.

### **Report on Phase I Commercialization Program (CAP)**

Rosemarie Wesson provided data tracking the Phase II award rate for grantees working with NSF’s two commercialization assistance contractors. To date, this tracking does not indicate a significant difference in contractor performance. The collection of award rate data by commercialization assistance contractor will continue and will be reported at future AdCom meetings.

The formal meeting adjourned at approximately 5:30 PM on this date.

**Wednesday, 22 June 2003**

**2006 Draft RFP for Phase I Commercialization Assistance Program (CAP)**

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Joe Hennessey solicited input regarding the content of the 2006 RFP for Phase I commercialization assistance and the format of the Phase II proposal's commercialization plan. Considerable discussion ensued regarding both topics.

Regarding the 2006 RFP, the discussion focused on methods to ensure the quality of the training materials and mentors used by the commercialization assistance contractors. Regarding the Phase II commercialization plan format, Meg Wilson prepared a draft of specific format changes to the Phase II commercialization plan and Errol Arkilic noted suggestions by various members of the AdCom. In summary, the AdCom discussed providing more concise and specific questions for the proposers to respond to and discussed the importance of the elements of the plan, concluding that a balanced response across the six major topics would be an indication of stronger proposals.

### **Phase II Draft RFP for a Phase II Commercialization Assistance Program (CAP)**

Errol Arkilic presented concepts which the NSF is exploring regarding a Phase II commercialization assistance program targeted at helping companies identify investment and partnership opportunities by leveraging local, regional and state resources. His presentation included a useful way of categorizing the predominant commercialization models used within the different sectors represented through the research topics. A "pilot" activity to provide an initial assessment of Phase II commercialization assistance has been initiated in collaboration with the Department of Energy, and NIH. Considerable discussion ensued regarding "best practice" models from other agency SBIR programs.

### **MatchMaker**

Two elements of the SBIR/STTR MatchMaker program were reviewed:

- 1) Corporate Strategic Partner focused, and
- 2) Venture Capital focused.

James Rudd presented current activities regarding the Strategic Partner focused MatchMaker program. At the 2005 Phoenix Grantees conference, corporate strategic partners were first incorporated into the conference.

Errol Arkilic presented the status of activities related to the Venture Capital focused MatchMaker program. The VC focused program has been in existence longer than the Strategic Partner focused program and Errol Arkilic reviewed initiatives to fine-tune the program.

### **Phase IIA Supplement**

James Rudd reviewed activities regarding the Phase IIA supplement. Currently, OII is exploring the expansion of (CREST) institutions to include Historically Black Colleges and Universities (HBCUs) and incorporate Research Assistants for Minority High School Students.

### **Technologies for Persons with Disabilities**

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Sara Nerlove presented activities associated with OII projects directed towards technologies for persons with disabilities. These grants are part of the current IT solicitation. Meritorious proposals are given preference.

### **Under-Represented Outreach**

Billy Williams (Consultant) and Winslow Sargent (Consultant) described their activities on behalf of the OII regarding outreach to encourage participation in SBIR/STTR by under-represented groups. These activities are aligned with the third goal of the SBIR legislation. Specifically: *“Foster and encourage participation by minority and disadvantaged persons in technological innovation”*

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Beginning at about 4 PM, the AdCom held closed discussions and began the preparation of a draft of its report for this meeting.

The formal meeting adjourned at approximately 6:30 PM on this date.

### **Thursday, 23 June 2005**

The AdCom completed the final draft of its report on this meeting. Beginning at about 10 AM, the AdCom presented its report to Mike Reischman (Deputy Assistant Director for Engineering) and the NSF SBIR/STTR Program Office team. AdCom members presented each of the items in Section D below, and discussion followed.

The meeting adjourned at approximately 11:00 AM.

### **C. FUTURE MEETING SCHEDULE**

The next two AdCom meetings are scheduled for:

- 1) January 24-26, 2006 and
- 2) May 18-20, 2006

The January meeting will be held at NSF Headquarters in Arlington, VA and the May meeting will coincide with the National SBIR/STTR meeting (May 16-18, 2006) and the OII Grantees conference (May 18-20, 2006), in Louisville KY.

## **D. COMMENTS AND RECOMMENDATIONS**

The items below are the specific recommendations of the AdCom:

### **1.0 Office of Industrial Innovation (OII) Strategy**

The AdCom was very pleased with the thoughtful content of the OII Draft Strategic Plan. The assignment of specific tasks to specific people is an important step in the implementation plan. The AdCom suggests that dates and milestones associated with these tasks be established.

The AdCom made several recommendations regarding the OII Strategy.

#### 1.1 Organization of the Office of Industrial Innovation (OII)

The AdCom strongly recommends that the formal creation of the OII from within the Division of Design, Manufacturing and Industrial Innovation (DMII) be implemented and formally announced as soon as possible.

#### 1.2. Proposed Division of Industrial Innovation and Partnerships

In addition, the AdCom strongly supports the planned organizational change merging the OII into the new Division of Industrial Innovation and Partnerships. The AdCom believes this change helps achieve the NSF goal of organizational excellence, especially given the science and engineering scope of NSF SBIR/STTR Program and the magnitude and relative size of the Program budget compared to other Engineering Division budgets.

The proposed organizational change aligns the SBIR/STTR program with other programs within the Directorate that emphasize innovation and partnerships. Specifically, this organizational structure leverages the common goals regarding innovation and collaborative partnerships resident in the SBIR/STTR, Grant Opportunities for Academic Liaison with Industry (GOALI), Partnership for Innovation (PFI) and Industry University Cooperative Engineering Research Centers (IUCRC/ERC) programs.

#### 1.3 SBIR/STTR Program Role in Achieving the NSF Innovation Vision

The AdCom believes the SBIR/STTR Program can make a major contribution to achieving the NSF “innovation” vision. This will be achieved in part through increased synergy between SBIR/STTR, NSF academic programs, large companies, and sources of capital. The AdCom strongly supports this role and encourages the OII to lead in serving this mission.

The AdCom believes that the SBIR Program complements and supplements the Engineering Directorate and all of NSF. The SBIR Program provides an essential link to the applied research of the Engineering Directorate and a channel for moving innovations to the market. This includes the SBIR Program’s attention to education, consistently high standards of applied advanced research, and overall innovation commercialization excellence. The AdCom further notes that the NSF SBIR/STTR Program, the Engineering Directorate and NSF in total, cover

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technology areas not addressed by other mission agencies and this strongly supports the NSF mission providing cross-sector, countrywide innovation and service to society.

## **2.0 Resource Allocation and Processes**

The AdCom was concerned that the Dwell time is too long for Phase II proposals and the trend is increasing. We recommend that OII convene panels faster, use the new Technology Assistants (TAs) to speed up this process, and use technology to improve processing. We recommend an aggressive goal of cutting dwell time in half for both Phase I and Phase II proposals.

A major AdCom concern is that Program Managers cannot spend sufficient time mentoring grantees. The AdCom recommends that NSF critically evaluate the allocation and possible reallocate its present resources to achieve more effective program management. Technology Assistants to Program Managers have been hired to offload logistical work associated with panel formation and execution, and to perform other support functions to free up program manager to spend more time on Phase II efforts. The AdCom recommends that additional Technology Assistants be hired, that reallocation of all potential resources be carefully evaluated to achieve this.

The AdCom continues to be concerned about the limited funds for travel by Program Managers. The effectiveness of Program Managers is enhanced by on-site meetings with grantees and collaborative partners. If the SBIR/STTR program is to continue building vital links to businesses, to manage awardee portfolios, and to support partnerships they must be able to travel more.

The AdComm strongly endorses plans to aggressively make the case for additional resources to enable awardee site visits, and other mentoring functions.

## **3.0 MatchMaker**

The AdCom recognizes that progress has been made in developing participation in MatchMaker by grantees, strategic partners, and investors. The AdCom recommends that the SBIR Program continue expanding MatchMaker. We further recommend that the Matchmaker be introduced in the Phase I stage.

We recommend that OII look at including a university/small business matching system within MatchMaker.

The potential for linking CAPI, CAPII, Phase IIA, minority outreach and Matchmaker into a partnership and assistance strategy is a tremendous opportunity and the AdCom strongly recommends that OII pursue these initiatives.

## **4.0 Report on Phase I and Phase II Commercialization Assistance Program (CAPI) and (CAPII) and Draft RFPs**

The AdCom recommends that:

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- 4.1 OII measures the impact and quality of mentoring services provided through its contractor(s). The AdCom expressed serious concern about the quality of the CAP I mentors and encourages OII to specify minimum qualifications for the mentors.
- 4.2 Convey the expectation to our contractor(s) that the commercialization scores continue to trend upward.
- 4.3 Continue to analyze the data to ensure that we track the relative quality of early and later Phase II submissions.
- 4.4 OII look for ways that the CAPs can be tailored to the needs of the proposing companies and get away from the cookie cutter system. There may be potential to pool funding to provide more flexible service.
- 4.5 OII focus CAP II resources into two separate categories: one for industry driven topic areas and one for investment driven topic areas.

The AdCom strongly supports providing commercialization assistance during Phase II. The proposal presented by Errol was a well thought-out plan of action. The AdCom recommends that all forms of assistance discussed during the AdCom meeting be explored (e.g., regional venture forums, strategic partnering, LARTA, NASVF, SpringBoard Enterprises, etc.).

## **5.0 Phase IIA Supplement**

The AdCom supports the SBIR participation with the NSF Centers of Research Excellence in Science & Technology (CREST) Program. This activity supports the AdCom's SBIR vision for synergy between the SBIR and academic programs. Broadening this activity to Historically Black Colleges and Universities (HBCUs) and to support High School internships are commendable short-term goals, which the AdCom strongly supports.

## **6.0 NRC Study Update and NSF Phase II/IIB and Phase III Outcomes**

We commend the NRC for the study that they are producing. Their research methodology is impressive and should be a tool used by OII to assess NSF's SBIR/STTR Programs.

The AdCom believes that management (NSF OII and NSF ENG) should proactively provide an organizational structure that recognizes the criticality of this function to the long-term survival of the program. We recommend that OII adopt as much of the NRC methodology as possible. Metrics and outcomes are crucial to understanding how to make the SBIR/STTR program more successful.

OII has a rich knowledge base on startups and small companies – it should use existing NSF resources (such as the Division of Science Resource Statistics) and key external resources (e.g. Kauffman Foundation, Technology Transfer Society) to produce essential studies of company characteristics and performance outcomes.

## **7.0 Technologies for Persons with Disabilities**

The focus that OII has put on supporting development of innovative technologies to serve people with disabilities as well as supporting companies owned by and employing the disabled through the SBIR/STTR program is to be commended.

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In light of the minimal resources available for this activity within the SBIR/STTR Program, the AdCom recommends that opportunities to link with other NSF resources be explored. The Education and Human Resources Directorate (EHR) Directorate is a specific suggested candidate for this purpose.

### **8.0 Under-Represented Outreach**

The pilot outreach program to support minority entrepreneurs, minority scientists and engineers, and minority companies to teach them about the SBIR/STTR program and encourage them to participate in the SBIR/STTR Program is a worthy initiative that should be continued and strengthened. The AdCom encourages OII to compile better data on accepted and declined proposers within under-represented groups, analyze that data and produce a prioritized work plan.

The AdCom believes that the results of five months of effort are modest and suggests more diversity on the team. The AdCom specifically expressed concern about the low number of women owned businesses that apply for and win SBIR/STTR grants and about the low number of women PIs and the need to target them in this effort also.

The AdCom recommends that a more specific and detailed plan with milestones be prepared to guide future activities. The plan should include embracing a broader set of under-represented groups, including additional minorities and women.

### **Closing Comments and Recommendations**

The AdCom believes the NSF SBIR/STTR Program currently has an extraordinary opportunity to contribute to the overall mission of the Engineering Directorate and all of NSF, and to support the national movement toward “innovation.” The AdCom is proud of the Program record that demonstrates continuing innovation and exemplary best practices for SBIR/STTR Program management.

END OF REPORT